



CellPath™ 90
ATM T1 WAN Multiplexer
Release Notes

Software Release 4.3.x

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1.0 Announcing the *CellPath* 90

These release notes highlight the features of the *CellPath* 90 ATM T1 WAN Multiplexer. The *CellPath* 90 is a low cost ATM T1 Channel Service Unit (CSU) that can multiplex up to four non-ATM applications onto a single ATM T1 facility.



Prior to installation of the *CellPath* 90 version 4.3 software, the unit **MUST** have been upgraded with the *CellPath* 90 SIMM Upgrade. Contact FORE Systems Technical Support, refer to *Contacting Technical Support on page 7*, for instructions on acquiring the SIMM Upgrade package.

2.0 Release 4.3 Enhancements

The *CellPath* 90 is continually undergoing improvements to add new capabilities which enable new applications and enhanced network performance. The following list of enhancements is included in software release 4.2 of the *CellPath* 90.

- Voice Channel Conditioning
- VPI.VCI to DLCI/DFA Mapping
- TFTP Configuration Storage and Retrieval

3.0 List of Features

The *CellPath* 90 ATM T1 WAN Multiplexer provides adaptation and concentration for up to four applications onto ATM PVC connections on an ATM T1 User-to-Network Interface (UNI). The *CellPath* 90 supports the following hardware and software features:

3.1 Hardware Features

- ATM T1 Network Interface w/onboard ESF CSU
- 2-4 Application Interfaces
- External Synchronization
- RS-232C Console Port
- Visual Indicators

3.2 Software Features

- Menu-driven User Interface
- Internal Diagnostics
- ATM T1 Facility Alarms
- ATM Performance Parameters
- Loopbacks
- PVC Traffic Generator
- Serial Port Control Lead Support

- Video on Demand
- Downloadable Software
- Trivial File Transfer Protocol (TFTP) Support

3.3 ATM Services

- Frame Relay Service Interworking
- Frame Data Interworking
- Ethernet Remote Bridging
- Structured T1 Circuit Emulation Services
- Multiple Bundle T1 DTE
- High-Level Data Link Control (HDLC) Channel Extension
- Bandwidth On Demand

3.4 Management Features

- SNMP Network Management
- TCP/IP Over ATM
- Interim Local Management Interface (ILMI)
- Telnet Support

4.0 Summary of Features

The following paragraphs provide a brief description of the features mentioned above for the *CellPath 90* ATM T1 WAN Multiplexer.

4.1 Hardware Features

The *CellPath 90* is a flexible platform designed to support a mix of circuit and packet traffic over ATM T1 services.

The *CellPath 90* aggregates user traffic from existing applications including Time Division Multiplexers (TDM) equipment and Frame Relay onto a single T1 ATM network. It can accommodate voice, video, data and image formats, simultaneously. It supports PBX tie trunks, packet data communication links and video conferencing equipment facilitating multi-media networking over T1 facilities.

ATM T1 UNI Interface - The ATM T1 network interface operates at 1.544 Mbps. This interface includes an on-board ESF (Extended Super Frame) CSU that conforms to ANSI and AT&T standards for ESF CSU equipment.

2-4 Application Interfaces - The *CellPath 90* is available in 2- and 4-port configurations. The 2-port model supports two V.35/RS449/X.21 EIA-530A serial interfaces that are individually configurable for circuit or frame applications. The 4-port model includes additional application ports, an Ethernet bridge port and a structured DSX-1 port.

External Synchronization - The *CellPath 90* can be configured to accept timing from one of four sources: (1) the ATM T1 network interface, (2) the structured T1 application port, (3) the external timing port, or (4) the internal clock.

RS-232C Console Port - The *CellPath 90* can be managed through its RS-232C (NMS) console port on the back of the unit at data rates from 300 bps to 115.2 kbps.

Visual Indicators - A row of tri-color LEDs on the front panel provide status information about the unit and its interfaces.

4.2 Software Features

Menu-driven User Interface - A menu-driven, password protected, text-based screen display user interface.

Internal Diagnostics - Power-up test routines to check the processor, RAM and interface circuits. The system status LED indicates green after successful completion of these tests.

ATM T1 Facility Alarms - Standard T1 facility alarms as defined in ANSI T1.102 and ATM Forum UNI 3.0 specifications are supported.

ATM Performance Parameters - The *CellPath 90* provides statistic collection for its ATM T1 network interface.

Loopbacks - Local and remote loopback capabilities are provided to aid in problem resolution and diagnostics.

PVC Traffic Generator - Test packet streams can be generated for troubleshooting AAL5 connections. This diagnostic aid is useful for checking continuity of virtual connections through an ATM network. The full VPI/VCI range (256 VPI/VCIs) is supported.

Serial Port Control Lead Support - The *CellPath 90* is able to control and monitor the signaling states of control leads on its serial ports.

Video on Demand - The *CellPath 90E* has the ability to monitor the state of the DTR or RTS control lead on its serial applications. Upon assertion of the control lead by the attached DTE device, the *CellPath 90E* connects traffic from the application port to the CBR PVC that has been configured for that port. Upon detection of the idle DTR or RTS state, the *CellPath 90E* stops sending traffic onto the CBR PVC. The released bandwidth may then be assigned to other active VBR or AAL5 circuits or data applications.

Downloadable Software - Software downloading to the *CellPath 90* through its RS-232C (NMS) console port enables customers and field personnel to perform field software upgrades.

Trivial File Transfer Protocol (TFTP) Support - The *CellPath 90* supports Trivial File Transfer Protocol (TFTP) for remote software downloads. TFTP is supported on a Classical IP (CIP) connection over the ATM UNI and MAC layer connection via Ethernet.

4.3 ATM Services

The *CellPath 90* supports three classes of ATM networking services: Frame Forwarding, Ethernet remote bridging and Circuit Emulation Services.

Frame forwarding is used to support frame-based data applications such as Frame Relay and ATM DXI and other HDLC-based link protocols. These protocols are supported on the *CellPath 90* serial ports.

Ethernet Remote Bridging - The *CellPath 90* also supports remote bridging on its Ethernet port. This feature enables users to connect from a local Ethernet segment to up to eight remote sites. The Ethernet bridge is a multi-port self-learning bridge that filters and forwards Ethernet frames onto Variable Bit Rate (VBR) PVCs. The bridged frames are encapsulated as bridged Ethernet PDUs as specified in RFC 1483.

Circuit Emulation Services - The third service the *CellPath 90* supports is circuit emulation. Circuit emulation provides a virtual private line service to the attached application. This service is used to support applications that require a fixed delay transmission path that preserves the bit integrity of the transmitted data. Circuit emulation is supported on the *CellPath 90* serial and DSX-1 ports.

The structured mode allows connectivity to a channelized T1 port at the other end of the connection. For example, consider an application where an H.320 user at a *CellPath 90* site wants to establish a connection to a central site where there is a *ForeRunner* ATM switch configured with the circuit emulation network module (i.e., VoicePlus). The H.320 equipment at the *CellPath 90* site would interface to one of the *CellPath 90* serial ports. The H.320 equipment at the *ForeRunner* site, possibly a multiport control unit (i.e., video bridge), would connect to one of the circuit emulation module's T1 ports. A 384 kbps connection would be supported by configuring the *CellPath 90* serial interface for 384 kbps operation and the *ForeRunner* T1 port for the equivalent number of timeslots or DS0s, that is, $6 \times 64\text{kbps} = 384\text{ kbps}$.

Multiple Bundle DTE T1 - The *CellPath 90* has the ability to map bundles of T1 DS0 channels ($N \times \text{DS0}$) onto ATM PVC connections (VPI/VCI). A maximum of 20 DS0s grouped in up to 6 bundles, can be sent into the ATM T1 in this way. (A maximum of 21 DS0s can be configured if configuring only 1 bundle.) Each bundle is mapped to a user configured PVC. Devices such as PBX's, video codecs and TDM multiplexers can be supported by this service.

High-Level Data Link Control (HDLC) Channel Extension - The *CellPath 90* supports AAL5 adaptation for HDLC-based link layer protocols. This feature enables the *CellPath 90* to support serial line link protocols in addition to Frame Relay and ATM DXI. In particular, the *CellPath 90* is able to connect to devices supporting X.25, SLIP, PPP, SDLC, HDLC and BiSync protocols. When configured for raw-HDLC support, the *CellPath 90* maps all frames received on the data port to a single VBR or CBR PVC.

Bandwidth on Demand - This service allows the V.35 CBR bandwidth available for other usage when the V.35 bandwidth is not being utilized. The unit polls for the existence of the selected control signal on the configured ATAM connection. The control signal may be either the DTR or RTS control leads, as selected by the user for the loss of DTE setting. If the de-assertion of the signal is detected, CBR data for that connection is not sent.

4.4 Management Features

SNMP Network Management - In this release the *CellPath 90* is managed through the console port. SNMP agent support is incorporated referencing RFC-1406, a DS-1 standard MIB and an Enterprise MIB.

TCP/IP over ATM - The implementation of this feature is based on:

- The unit identifying IP packets carrying the unit's own IP address from three different physical interfaces: (1) a single defined ATM PVC; (2) an Ethernet packet using the unit's MAC address; and (3) the currently supported SLIP connection.
- The TCP/IP stack forwarding the packet to the SNMP agent, the TFTP process, or the TELNET daemon depending upon the port address in the packet.
- The unit supports all currently supported MIB files through the serial port SNMP interface.

Interim Local Management Interface (ILMI) - The *CellPath 90* supports the ATM Forum UNI 3.1 Interim Local Management Interface (ILMI). ILMI enables the *CellPath 90* to have its ATM address automatically assigned. In addition, the *CellPath 90* is able to communicate its IP address to the network, enabling a network management application, such as *ForeView*, to auto-discover it. Similarly, PVC status information is also available to the network management application providing important information about the health and status of network connections.

Telnet Support - The *CellPath 90* supports a Telnet client for remote or local IP access to its User Interface. Telnet access is supported on both the ATM T1 interface and Ethernet port.

5.0 Release 4.3 Enhancements

5.1 Voice Channel Signal Conditioning

This new option allows the user to direct the *CellPath 90* to apply the specified signaling pattern towards the DTE (e.g., PBX) in the event of a fault condition at the ATM network port. These bits are used by the *CellPath 90* to signal to the attached DTE that the voice path is unavailable and should not be used.

The DTE4 Configuration screen contains the settings for the default on-hook and off-hook settings. The allowable values are '0' (zero) through 'F' hexadecimal. The *CellPath 90* default settings should be set to '0' (zero) for on-hook and 'F' for off-hook. The user should set these values to match the on-/off-hook values of the connected system.

5.2 VPI.VCI to DLCI/DFA Mapping

When configuring ATM connections, the Frame Relay DLCI is automatically calculated when entering the applicable VPI.VCI value, and conversely the VPI.VCI is automatically calculated when entering a valid DLCI value.

VPI.VCI to DLCI/DFA mapping is available through the ATM Configuration screen. ATM DXI and Frame Relay protocols use this mapping to direct traffic over specific VCCs. ATM DXI uses DFA for logical channel IDs. Frame Relay uses DLCI. The bit mapping to VPI.VCI is identical for both protocols.

When a user enters a VPI.VCI value, the *CellPath 90* automatically converts this value to the appropriate DLCI/DFA equivalent. This is the default mapping of ATM VCC connections to ATM DXI or Frame Relay connections. With this release of *CellPath 90* software, the default DLCI/DFA value may be overwritten by the operator if manual mappings are required. To overwrite the value, the operator needs to position the cursor on the DLCI field of the ATM Connection screen and key in the desired value. Pressing the <Enter> key then saves the new DLCI/DFA value to the *CellPath 90* configuration file.

5.3 TFTP Configuration Storage and Retrieval

This release of the *CellPath 90* software supports both tftp 'put' and 'get' operations. Using the 'get' operation, the user can retrieve the *Cellpath 90* configuration database for storage off-line from the *Cellpath 90*. This allows system administrators to save the installed configuration to disk which can enable easier re-configuration in the event of a catastrophic system failure. The configuration database is in a non-editable format.

Using the tftp 'put' operation, a saved configuration database can be restored to a *CellPath 90*. Additionally, in sites where there are several *CellPath 90* systems with similar configurations, the system administrator could also configure one, save the configuration database to disk, and then restore the configuration to other units having only to fine-tune the other units with unique configuration information, as required (i.e., SYSTEM-->INTERFACES screen addresses, etc.) after restoring the *CellPath 90* configuration database.

6.0 Known Issues and/or Concerns

6.1 TFTP Software Download

When downloading *CellPath* 90E software via TFTP, the user must wait approximately thirty (30) seconds upon completion of the TFTP transfer before restarting the unit. This thirty seconds is required by the operating system to process the compressed binary image and reprogram the flash memory.

6.2 User Interface (UI) Response

A reduction in User Interface response can be observed when viewing DS1 and ATM Statistics screens when more than 21 DS0s in one bundle, or 20 DS0s in 6 bundles, are configured. This has no effect on the performance of the *CellPath* 90, only in the rate of updates to the user interface.

6.3 Making Configuration Changes

When making changes in the user interface, the change is not made until the Enter key is pressed on the highlighted item. If the highlighted cursor is moved without pressing the Enter key first the change is ignored and does not take effect.

6.4 Term Port Application

If the 'Term port application' option in the SYSTEM/TERM menu is changed from MENU to SNMP and then back to TERM, it is necessary to set front panel DIP switch 1 Off (SNMP) and then On (TERM) for the change to take effect.

6.5 DTE4 T1 Configuration

When configuring multiple channels on the T1 port, 21 channels is the maximum number of DS0 channels that are supported by the *CellPath* 90. Note: The payload capacity of an ATM DS1 signal is 1.344 Mbps.

The maximum number of NxDS0 bundles that can be configured is six. The user should be careful not to configure more than a total of 20 channels in the DTE4 T1 configuration across multiple bundles.

6.6 SNMP Read/Write Community Strings

Any user having access to either the SNMP Read or Write community strings has the capability to alter the configuration settings of the *CellPath* 90. If a customer does not require that all users have this level of control, the Read and Write community strings should be protected much the same as passwords.

7.0 Contacting Technical Support

In the USA, FORE Systems' Technical Support can be contacted by any one of four methods:

1. If Internet access is available, FORE Systems' Technical Support can be contacted via e-mail at the following address:

support@fore.com

2. FAX your questions to "support" at:

412-742-7900

3. Send questions, via US Mail, to the following address:

**FORE Systems, Inc.
1000 FORE Drive
Warrendale, PA 15086-7502**

4. Telephone your questions to "support" at:

1-800-671-FORE (3673)

or

412-635-3700

Technical support for non-U.S.A. customers should be handled through your local distributor.

No matter which method is used for technical support, be prepared to provide the serial number(s) of the product(s) and as much information as possible describing the problem/question.

